Claims

[c1] 1. A method of quantifying the economic effect of providing a product with a product warranty, comprising the acts of:

developing a statistical model of a product"s failure rate;

developing a model of the cost over time of a product having a product warranty; and

calculating an effective cost of the product from the statistical model of a product"s failure rate and the model of the cost over time of a product having a product warranty.

[c2] 2. The method as recited in claim 1, wherein calculating comprises performing a convolution of the statistical model of a product"s operating life and the model of the cost over time of a product having a product warranty.

[c3] 3. The method as recited in claim 1, wherein developing a statistical model of a product"s life comprises collecting data from previous failures of the same or similar products.

[c4] 4. The method as recited in claim 3, wherein developing a statistical model comprises calculating a cumulative probability of failure of the product as a function of time.

[c5] 5. The method as recited in claim 1, wherein the model of the cost over time of a product includes a cost associated with a failure of a product during a warranty period.

[c6] 6. The method as recited in claim 2, wherein the convolution produces a cumulative probability that the product will have an actual cost for each of a plurality of actual costs.

[c7] 7. The method as recited in claim 6, wherein calculating an effective cost of a product with a product warranty comprises taking the average of the plurality of actual costs, each actual cost being weighted by its respective cumulative probability.

[c8] 8. The method as recited in claim 1, wherein developing a model of the cost over

time of a product having a warranty comprises developing a model of the cost over time of a product having a product warranty for each of a plurality of product warranties; and calculating comprises calculating the effective cost of a product having a product warranty for each of the plurality of product warranties.

[c9]   9.The method as recited in claim 1, further comprising the act of graphically representing the effective cost of a product as a function of the product warranty.

[c10]   10.The method as recited in claim 1, further comprising the act of calculating an effective selling price of a replacement product for the product having a warranty.

[c11]   11.The method as recited in claim 10, further comprising the act of calculating a variation in profit of a product as a function of the product"s warranty.

[c12]   12.A method of quantifying the economic effect of providing a product with a product warranty, comprising the acts of:
developing a statistical model of a product"s failure rate;
developing a model of the actual selling price of a replacement product over time; and
calculating an effective selling price for a replacement product from the statistical model of a product"s operating life and the model of the actual selling price of a replacement product over time.

[c13]   13.The method as recited in claim 12, wherein calculating comprises performing a convolution of the statistical model of a product"s operating life and the model of the selling price of a replacement product over time.

[c14]   14.The method as recited in claim 13, wherein the convolution produces a cumulative probability that the replacement product will have an actual selling for each of a plurality of actual selling prices.

[c15]
           15.The method as recited in claim 14, wherein calculating an effective selling price of a replacement product comprises producing a weighted average of the

plurality of actual selling prices and the cumulative probabilities.

[c16]   16.The method as recited in claim 12, wherein developing a statistical model of
a product"s life comprises collecting data from previous failures of the same or
similar products.

[c17]   17.The method as recited in claim 16, wherein developing a statistical model
comprises calculating a cumulative probability of failure of the product as a
function of time.

[c18]   18.The method as recited in claim 12, wherein the model of the selling price of
a replacement product over time includes discounts in the selling price of the
replacement product associated with the product warranty.

[c19]   19.The method as recited in claim 12, wherein developing a model of the actual
selling price comprises developing a model of the actual selling prices of a
replacement product for each of a plurality of product warranties and
calculating comprises calculating the effective selling price of a replacement
product from the convolutions for each of the plurality of product warranties.

[c20]   20.The method as recited in claim 19, further comprising the act of graphically
representing the effective selling price of a replacement product as a function of
the product warranty.

[c21]   21.The method as recited in claim 12, further comprising the act of calculating
an effective cost of a product having a warranty.

[c22]   22.The method as recited in claim 21, further comprising the act of calculating
a variation in profit of a product as a function of the product"s warranty.

[c23]   23.An analysis tool for a product having a warranty, comprising:
a computer system;
a statistical model of a product"s life stored in the computer system; and
economic data for the product stored in the computer system;
wherein the analysis tool is operable to provide a user with quantified economic
information for a plurality of warranty scenarios based on the statistical model
of a product"s life and the economic data for the product.

[c24]   24.The analysis tool as recited in claim 23, further comprising a computer program stored in the computer system, wherein the computer program directs the computer system to produce the quantified economic information.

[c25]   25.The analysis tool as recited in claim 23, wherein the quantified economic information is displayed graphically by the computer system.

[c26]   26.The analysis tool as recited in claim 23, wherein the economic data comprises actual product cost for a product having a failure during a warranty period and actual product cost for a product having a failure during a non-warranty period.

[c27]   27.The analysis tool as recited in claim 23, wherein the economic data comprises replacement product selling price during a warranty period and replacement product selling price during a non-warranty period.

[c28]   28.The analysis tool as recited in claim 23, wherein the quantified economic information comprises effective cost data for the product over a range of warranty durations.

[c29]   29.The analysis tool as recited in claim 23, wherein the quantified economic information comprises effective selling price data for a replacement product over a range of warranty durations.

[c30]   30.The analysis tool as recited in claim 23, wherein the quantified economic information comprises effective profit margin data for the product over a range of warranty durations.

[c31]   31.A computer program stored in a tangible medium, wherein the program enables a computer system to provide a user with quantitative economic data for a product as a function of a warranty on the product.

[c32]   32.The computer program stored in a tangible medium as recited in claim 31, wherein the quantitative economic data is an effective cost of the product as a function of the warranty.

[c33]
         33.The computer program stored in a tangible medium as recited in 31, wherein

the quantitative economic data is an effective selling price of a replacement product as a function of warranty.

[c34] 34. The computer program stored in a tangible medium as recited in 31, wherein the quantitative economic data is a variation in profit margin of a product as a function of the warranty.

[c35] 35. The computer program stored in a tangible medium as recited in 31, wherein the computer program directs the computer system to perform a convolution of a first model representing the cost over time of a product having a warranty and a second model representing the unreliability over time of the product.

[c36] 36. The computer program stored in a tangible medium as recited in claim 35, wherein the second data set representing the unreliability over time of the product comprises a Weibull distribution.

[c37] 37. The computer program stored in a tangible medium as recited in claim 35, wherein the convolution comprises a cumulative probability distribution of possible actual costs of the product.

[c38] 38. The computer program stored in a tangible medium as recited in claim 37, wherein the computer program directs the computer system to perform a weighted average of the cumulative probability distribution and possible actual costs to produce an effective cost of the product.

[c39] 39. The computer program stored in a tangible medium as recited in claim 38, wherein the computer program directs the computer system to produce the effective cost of the product for each of a plurality of warranty periods.

[c40] 40. The computer program stored in a tangible medium as recited in claim 39, wherein the computer program directs the computer system to produce an effective selling price of a replacement product for the product.

[c41] 41. The computer program stored in a tangible medium as recited in claim 40, wherein the computer program directs the computer system to produce an effective profit margin for the product from the effective cost of the product and the effective selling price of a replacement product for the product.

[c42]   42.The computer program stored in a tangible medium as recited in claim 39, wherein the computer program directs the computer system to graphically display the effective cost of a product as a product of warranty.

[c43]   43.The computer program stored in a tangible medium as recited in claim 40, wherein the program directs a computer system to graphically display the effective selling price of a replacement product as a function of warranty.

[c44]   44.The computer program stored in a tangible medium as recited in claim 41, wherein the program directs a computer system to graphically display profit margin of a product as a function of warranty.